

varieties or local races, and mongrels are the result. Consequently sterility need not be anticipated; but, on the contrary, improvement is more likely to ensue (should there be no deficiency in food) than when the stock is bred in and in.

It also tends to show that where small, but not malformed, breeds of trout exist, riparian proprietors had far better investigate the condition of the food-supply and nature of the waters in their streams than rely upon the introduction of larger races. They may be assured that the Gillaroo, when it cannot obtain shellfish, will in time lose its thickened stomach; and descendants of the various malformed varieties which I have alluded to will revert to common brook-trout—that, in short, sooner or later new stock will become indistinguishable from the original local breed in colour, form, and size.

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On a Marine Caddis-fly (*Philanisus*, Walker, = *Anomalostoma*, Brauer) from New Zealand. By R. M<sup>c</sup>LACHLAN, F.R.S., F.L.S., Hon. Memb. N.-Z. Institute.

[Read June 15, 1882.]

IN April of this year I received a letter from Prof. F. W. Hutton of Canterbury College, Christchurch, New Zealand, in which was the startling announcement that the larva of a Caddis-fly lives habitually in rock-pools, *between high and low water-marks*, in Lyttleton Harbour in that colony, and forms its case of coral-line seaweed. He had often attempted to rear the perfect insect, but only once succeeded, and then when he was away from home; so that only the dead remains were obtainable\*. Prof. Hutton gave me the welcome intelligence that these remains, with larva and case, were on their way to this country in charge of a friend who was coming home. This gentleman (Mr. C. C. Bowen, Governor of the Canterbury Province) recently arrived, and the materials are now in my hands.

We are so accustomed to associate Caddis-worms with fresh water, that the arrival of these materials was awaited by me with not unnatural impatience. We are already acquainted with a terrestrial species (*Enoicyla*); but no truly marine form had

\* A short notice to this effect was published by me in the 'Entomologist's Monthly Magazine,' vol. xviii. p. 278 (May 1882).

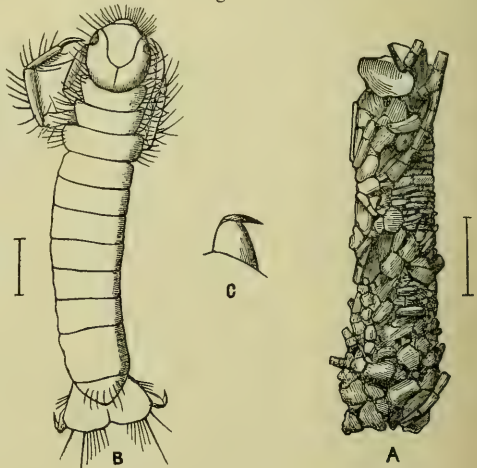
been recorded. It is, I believe, known that at least one species can exist in the brackish water of the shores of the Baltic, at any rate in the vicinity of the mouths of large rivers. Others certainly manage to exist in marshes that are liable to the occasional influx of salt water during high tides, and in pools near the sea-shore into which sea-water sometimes enters in large quantities during storms. These instances, however, scarcely affect the matter now under consideration. So far as I can ascertain, these New-Zealand larvæ are quite outside the influence of river-water; and the materials of which the case is chiefly composed appear to prove this.

The specimens before me are not in good condition on the whole. They consist of:—

(i.) A straight tubular cylindrical case (fig. 1, A), 10 millim. long by nearly 3 millim. in diameter, which is nearly equal throughout. To the inner silken tube are attached fragments of some white coralline seaweed (with a few quartz[?] fragments &c.), arranged in no special order. In one or two instances the fragments are larger, showing the jointed nature of the alga; but mostly they consist of single joints. The case is empty; but I think it was a pupa-case, one end showing signs of having been closed in a manner that is usual when the inmate is in the pupal condition.

(ii.) A larva (probably young), mounted as a transparent object on a microscopic slide, crushed and a good deal damaged. This larva (fig. 1, B) is 6 millim. long. The head is rounded oval in form, blackish above, but with three pale spots, one posteriorly, the two others (smaller) on each side of the disk; there are also pale dots round the small eye-spots; the anterior margin and labrum are provided with long hairs. Viewed from beneath, the mouth-parts

Fig. 1.



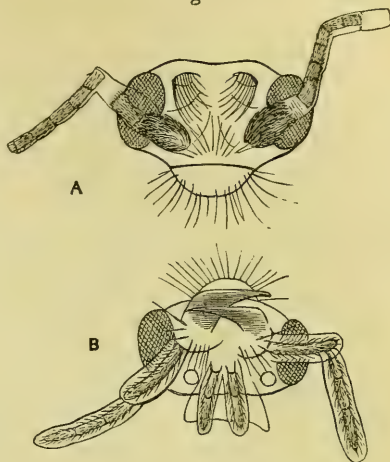
A. Case. B. Larva. C. Terminal claw of larva.

are not discernible. The pronotum is narrow and transverse, but with the anterior angles much produced; the colour is testaceous, mottled with paler; fringed with long hairs. Mesonotum similar in form, but somewhat broader, and the angles less produced; almost entirely pale yellowish, slightly mottled with testaceous; less chitinous than either the head or pronotum. Meta-notum the broadest segment of the thorax, scarcely chitinous; the sides apparently with a hair-bearing tubercle.

Legs wholly bright yellow; the anterior pair short, the two other pairs longer (not extraordinarily long) and nearly equal. All the legs are simple (without teeth or spines), and present nothing unusual in form; the claw very long and curved. Abdominal segments having the sides nearly parallel, apparently bright yellow in life; terminal segment dilated, its posterior margin angular and notched in the middle. Anal claw (fig. 1, C) very short, piceous, much curved, and seated on a strong protuberance; on either side of the posterior margin of the anal segment is a tuft of very long black hairs. I can discover no trace of stigmata in the larva in its present condition; and the respiratory filaments are rather uncertain; but there are distinct traces of bundles composed of three or four short filaments on either side of the ventral surface of the first and second abdominal segments; on the other segments I cannot define traces of filaments.

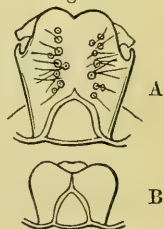
(iii.) On the same slide are disconnected fragments (figs. 2, 3, and 4. Fig. 2. A, B, head above and beneath: fig. 3. A, B, mesonotum and metanotum: fig. 4. A, maxillary and labial palpi; B, portions of tarsus; C, mandibles) of what Prof. Hutton assumed to be the perfect insect. Here he was a little mistaken. The frag-

Fig. 2.



A. Head of pupa, above. B. Same, beneath.

Fig. 3.

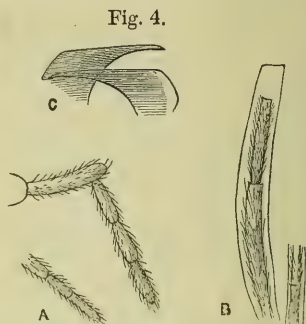


A. Mesonotum.

B. Metanotum.

Of pupa.

ments are those of a male pupa which had died before transformation, probably from being without any thing in the jar of water up which it could crawl into the open air for metamorphosis. All the fragments show the transparent pupa integument enveloping the perfect insect, which was fully formed and ready to emerge. Ordinarily it would be almost impossible to identify a species from such fragments. The mandibles are very long and strong, sickle-shaped, but considerably dilated at the basal articulation (they are more formidable structures than are often seen in Trichopterous pupæ). But neither



these, the antennæ, nor the unexpanded wings would have given any clue had the maxillary palpi not rendered identification both possible and certain. These organs prove that the New-Zealand marine Caddis-fly is no other than *Philanisis plebejus*, Walker (= *Anomalostoma alloneura*, Brauer), a species in which the maxillary palpi of the male present a remarkable and unique conformation of the second joint, which is very long, curved, and having the insertion of the third joint placed considerably before its apex. (In the female the second joint is also long; but the third joint is inserted, as is usual, at its apex.)

So far this is a very satisfactory conclusion to arrive at. But *Philanisis plebejus* is already known from several localities in New Zealand; and one would like to know if it is *always* found on the sea-shore. The other locality-records give us no information on this point.

The insect was first noticed (I can scarcely say "described") by Walker in 1852, in Part I. of the 'Catalogue of the Specimens of Neuropterous Insects in the Collection of the British Museum,' p. 115, as a new genus and species which he termed *Philanisis plebejus*, indicated as from "New Zealand, Dr. Sinclair." Walker made no mention of the extraordinary formation of the palpi; his diagnosis is very vague; and he placed the insect in the family Hydropsychidæ. In the Neuropterous portion of the 'Reise der Novara,' published in 1866, Dr. Brauer gave a very detailed and full description, with excellent figures, of the

same insect under the name *Anomalostoma alloneura* (pp. 15-20, pl. i. figs. 6 A, 6 B), worked out with that care for which he is so well known, the examples having been taken at Auckland by Frauenfeld.

Brauer evidently had suspicions that *Anomalostoma* might be identical with *Philanisis*, as is indicated at p. 16, and entered a protest against the adoption of Walker's name in case the insects should prove the same. It is not my intention here to enter into a discussion on the application of the rule of priority; suffice it to say that I agree with Brauer on principle, but sometimes doubt the practicability of his suggestions. He placed the insect in the family Rhyacophilidæ, in which he was followed by me in the Journ. Linn. Soc., Zool. vol. x. p. 214.

Now that we know the habits of the insect, it is clear that it cannot remain either amongst the Hydropsychidæ or the Rhyacophilidæ. In both these families the larvæ construct permanently *fixed* cases, not movable tubes. The anomalous structure of the palpi, and also the neuration, would suggest the Sericostomatidæ as a position; but in this family the maxillary palpi of the male are not only differently formed to those of the female, but have also fewer joints. In *Philanisis* the joints are five in both sexes; therefore I see no alternative other than to consider it an anomalous form of the family Leptoceridæ, to which the structure of the larva is not opposed. Perhaps the point on which it is most divergent from any other described species of this family is the structure of the apex of the abdomen in the female, which is produced into a very long, straight, pointed, horny ovipositor (fig. 5) (as in many Hydro-psychidæ and Rhyacophilidæ, but more pronounced); in what way this structure may perhaps be in correlation with the presumably constant marine habitat remains to be seen.

The importance of Prof. Hutton's discovery rendered it desirable that a detailed account should be given so far as the materials would permit. Now that the connexion of this marine larva with *Philanisis* is proved, I hope he, or some other entomologist in New Zealand, may be able to give us fuller details; examples of the larvæ and pupæ preserved in alcohol are also desirable.

Fig. 5.



Ovipositor of female.

## POSTSCRIPT.

In the same package with the materials for the marine Caddisfly Prof. Hutton forwarded specimens illustrating the economy of two other species of New-Zealand Trichoptera, from the Weka Pass, Canterbury.

(i.) *Helicopsyche*.—Numerous cases regularly formed, constructed of fine sand,  $3\frac{1}{4}$ –4 millim. in diameter by  $1\frac{3}{4}$ – $2\frac{1}{4}$  millim. high, with nearly three complete whorls. Some are empty; others contain larvæ and pupæ. Accompanying them were two female pupæ emerged from the cases, and ready for the final metamorphosis. So far as can be judged, the perfect insect should be congeneric with the species that have been reared in Europe and in North and South America. I refrain from bestowing names upon cases only\*.

(ii.) Fixed cases, probably constructed by the larvæ of some unknown genus and species of Rhyacophilidæ, which should be of about the size of some of the smaller European species of *Rhyacophila*. The pupa is enveloped in a special cocoon, as is usual in the family, and does not agree with the genus *Rhyacophila* either in spurs or palpi. *Philanisus* having been removed from the family, the latter is now without any described representative in New Zealand. Of two cases, one is wholly composed of stony (? granitic) fragments; the other partially of similar fragments, partially of shells (of two or three species), and partially of the cases of the *Helicopsyche* referred to above.

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Contributions to the Ornithology of New Guinea.

By R. BOWDLER SHARPE, F.L.S.—Part VIII.

[Read May 4, 1882.]

THE present paper contains notes on collections made by Mr. A. Goldie in districts at the back of the Astrolabe range, in South-eastern New Guinea, and by Mr. Charles Hunstein on Normanby Island, on the south shore of the mainland of the China Straits, and on the banks of a river at the end of Milne Bay.

In a communication which I recently made to this Society (*antèa*, p. 317), I gave diagnoses of certain undescribed species of birds which had been forwarded to my friends Messrs. Osbert

\* *Helicopsyche*-cases from New Zealand have long been in the British Museum, and have several times been alluded to by me in various published notes.